

CLAIMS

1. A method for producing a steel ingot, which comprises the steps of:

forming a magnesium oxide, in which molten steel is adjusted to contain a sufficient amount of Mg to make oxides admixed in the molten steel so as to have a chemical composition a primary component of which is MgO; and

dissociating the magnesium oxide contained in the molten metal into Mg and oxygen by making a degree of vacuum of the melting environment higher than that of the former process of forming a magnesium oxide whereby making a Mg content in the molten steel to be not more than 50% of that in the former process of forming a magnesium oxide.

2. The method according to claim 1, wherein the first step of forming a magnesium oxide comprises casting the molten steel after adjusting it, the step of forming a magnesium oxide being referred to as "a primary melting process", and the second step of dissociating the magnesium oxide is carried out by remelting the cast steel under a degree of vacuum higher than that of the primary melting process, whereby dissociating the magnesium oxide contained in the molten metal into Mg and oxygen thereby making a Mg content in the molten steel to be not more than 50% of that in the primary melting process.

3. The method according to claim 2, wherein the

remelting is of a vacuum arc remelting.

4. The method according to claim 2 or 3, wherein the steel ingot contains a nitride forming element as a component of the steel.

5. The method according to any one of claims 1 to 4, wherein the degree of vacuum in the first step of forming a magnesium oxide is 6 kPa to 60 kPa and the degree of vacuum in the second step of dissociating the magnesium oxide is lowered to less than 0.6 kPa.

6. The method according to any one of claims 1 to 5, wherein the relationship between an amount of Mg (Mg_{OXI}) and an amount of Al (Al_{OXI}) is adjusted in the first step of forming a magnesium oxide so as to meet the following equation:

$$Al_{OXI} \text{ (mass ppm)} / Mg_{OXI} \text{ (mass ppm)} = 5 \text{ to } 100.$$

7. The method according to any one of claims 1 to 6, wherein Mg is added into the molten steel as a Ni-Mg alloy which contains from exclusive zero to not more than 20 mass % of Mg.

8. The method according to any one of claims 1 to 7, wherein the steel ingot contains 0.01 to 6 mass % of Al.

9. The method according to any one of claims 1 to 8, wherein the steel ingot contains 0.1 to 2 mass % of Ti.

10. The method according to any one of claims 1 to 9, wherein the steel ingot is of a maraging steel.

11. The method according to any one of claims 1

to 9, wherein the steel ingot is of a tool steel.

12. The method according to claim 10, wherein the maraging steel consists essentially of, by mass, less than 10 ppm of O (oxygen), less than 15 ppm of N (nitrogen), not more than 0.01% C, 0.3 to 2.0% or less of Ti, 8.0 to 22.0% of Ni, 5.0 to 20.0% of Co, 2.0 to 9.0% of Mo, 0.01 to 1.7% of Al, and the balancer of Fe and unavoidable impurities.